Claims:

1. An array-type optical device having enhanced pumping efficiency, comprising:

a substrate;

a cladding layer having a plurality of valley portions and ridge portions formed on the substrate;

a plurality of linear gain medium structures, each formed on the surfaces of the valley portions and the ridge portions of the cladding layer, or inserted in the valley portions and the ridge portions of the cladding layer so as to be separated from their surfaces by designated distances; and

a pumping light source disposed above the cladding layer for pumping the gain medium structures by means of light directed downward therefrom.

2. The array-type optical device having enhanced pumping efficiency as set forth in claim 1, wherein the cladding layer is made of a material which can transmit the light irradiated from the pumping light source.

3. The array-type optical device having enhanced pumping efficiency as set forth in claim 1, wherein the pumping light source is a LED.

4. An array-type optical device having enhanced pumping efficiency, comprising:

a substrate;

a lower cladding layer formed on the substrate;

a plurality of linear gain medium structures formed on the lower cladding layer; and

a pumping light source disposed above the linear gain medium structures for pumping the gain medium structures by means of light directed downward there from,

wherein the linear gain medium structures are densely disposed and curved at their terminals so that other portions of the linear gain medium structures are included in the beam spot of the pumping light source.

5. The array-type optical device having enhanced pumping efficiency as set forth in claim 4, further comprising an upper cladding layer formed on the gain medium structures,

wherein the upper cladding layer is made of a material which can transmit the light irradiated from the pumping light source.

6. The array-type optical device having enhanced pumping efficiency as set forth in claim 4, wherein the pumping light source is a LED.

7. An array-type optical device having enhanced pumping efficiency, comprising:

a substrate;

a lower cladding layer formed on the substrate;

a plurality of linear gain medium structures formed on the lower cladding layer; and

upper and lower pumping light sources, each disposed above the upper surfaces of the gain medium structures and below the lower surfaces of the gain medium structures for pumping the gain medium structures by means of light directed downward and upward there from,

wherein the substrate and the lower cladding layer are made of a material which can transmit the light irradiated from the pumping light sources.

8. The array-type optical device having enhanced pumping efficiency as set forth in claim 7, further comprising an upper cladding layer formed on the gain medium structures,

wherein the upper cladding layer is made of a material which can transmit the light irradiated from the pumping light sources.

9. The array-type optical device having enhanced pumping efficiency as set forth in claim 7, wherein the pumping light sources are LEDs.